

**DOWN BRANCH FIBER FABRIC AND
THE FABRICATING METHOD THEREOF**

FIELD OF THE INVENTION

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The present invention relates a kind of textile technology for down branch fiber, more particularly the present invention relates a kind of down branch fiber fabric and its fabricating method.

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BACKGROUND OF THE INVENTION

Feather and down are all good natural heat-retaining materials. Feather has a flat shape with parallel barbs grown on quills in rows. Down has a shape liking cloud and down can be sorted as down-feather and semi-plume. The down feather has a fluffy structure with little shaft or no shaft. The semi-plume has a fluffy structure too, but it has well formed shaft. For these characters, the feather and down cannot be sorted as fiber. Using common technology, we can separate barb-fibers of the feather or down-branch-fibers of the down or semi-plume from their quill or shaft to get separated barb-fibers or down-branch-fibers. The barb fiber has a same structure as the down-branch-fiber but is coarser than the down-branch-fiber. **The barb-fiber and down-branch-fiber both are defined as down branch fiber thereafter.** Since down branch fiber has very tiny barbules and hooks distributing equally along fiber, the down branch fiber is considered as a kind of unique nature fiber with many merits, for example, soft, light, heat retaining, etc. However, to us common textile

technologies such as combing, twisting, draughting to process down branch fibers is very difficult since the down branch fibers are non-crimp, fluffy, and very short, most of them are around 15mm to 25mm. This is the main reason
5 that people use feather, barb-branch-fiber and down branch fiber as stuffing materials for making down garment, quilts, ticks and other bedding only.

Chinese Patent Publication Number CN1222591A titled "Down
10 Branch Fiber Fabric and Its Fabricating Method" and Chinese Patent Publication Number CN1293270A titled "Down Shell Fabric" described a kind of spinning method for the mixture of downs or down-branch-fibers with textile fibers.

15 According to the common knowledge in the down products industry, down is short, soft fluff got from feathers of waterfowls, such as geese, ducks and the like. Down also means a mixture of down, feather, barb-fiber, down branch fiber and other impurity, in which the ration of down must
20 be over the lowest standard stipulated by this industry. The "down" described in the above-mentioned two patent publications is not a kind of material having same structure, it can't be considered as fiber too. Where, the fiber means a kind of natural or synthetic thin filiform
25 textile material only. Downs can't be used as textile materials for spin directly. If spinning the mixture of downs with other textile materials for yarns, it is impossible to get smooth and uniform yarns since down is fluffy and mixed with other impurity, such as feather and
30 barb-fibers. During processing downs will be blown away

since downs can't be mixed with other textile fibers as a uniform combination.

SUMMARY OF THE INVENTION

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The purpose of the present invention is to provide a fabricating method for making fabrics from down branch fiber directly; also the purpose of the invention is to provide products made by the fabricating method, i.e. down
10 branch fiber fabrics with strong tensile strength.

The above-mentioned objects are achieved by:

Down branch fiber fabrics are made by mixing down branch
15 fibers with textile fibers, having a blend ration by weight of down branch fiber 10-100%, textile fiber 0-90%.

The down branch fibers are got from handling downs and feathers, which are gathered from waterfowls such as geese,
20 ducks and the like. Cut quills and shafts off from downs, semi-plumes and feathers, then get down branch fibers.

Textile fibers are selected from at least one of nature fibers including cotton, wool, ramie fiber or synthetic
25 fibers including terylene, acrylic, nylon, polyvinyl chloride, spandex, vinylon or chemical viscose fibers.

The method for producing down branch fiber fabrics having following processes: screening raw materials, feeding raw
30 materials into sliver feeding device, twisting, winding packages, heat setting and weaving. The temperature for

heating setting is from 80° to 120° C, heating time is from 5 to 20 minutes.

5 The sliver feeding devise comprises a raw material tank, a feeding belt conveyer, an adjustable even roller, a brambly catching roller, a first subsiding room, an even roller, a brambly dividing roller, a second subsiding room. All these sub-devises are connected and communicated. Discharging port with a bar shape cross section is
10 connected with dust cages coincidentally.

The present invention possesses many advantages comparing with common technologies in this field:

15 A. The sliver feeding devise has the brambly catching roller and the brambly dividing roller to comb the down branch fibers twice; has the adjustable even roller and the even roller to control the feeding quota of down branch fibers equably around all process; has first and second
20 subsiding rooms to subside the raw materials twice in smooth and equal quantity to ensure that the down branch fibers can pass through the discharging port uniformly. With above-mentioned devises, the present invention solves the difficulties for processing down branch fibers, i.e.
25 non-crimp, fluffy and can't hold together. Therefore, the difficulty for producing down branch fibers as yarns with current processing (combing, twisting, and drafting) is overcome. The present invention finds a way to use down branch fibers to produce yarns directly without a crimp
30 treatment or a denaturation treatment. Thus, the new devices avoid breaking or damaging down branch fibers

during process. Therefore, textile products made by down branch fibers become a reality.

5 B. Since the present invention adapts reel heat Setting, the shortcomings of down-branch fibers, such as non-crimp, restoring original shape, anti-twisting, low tensile strength, etc. are overcome.

10 C. Down branch fiber is a kind of nature abnormality fiber. It is light, heating-retaining. The fabrics made by down branch fiber keep these good merits too.

15 D. The present invention provides bright future to use down branch fibers to fabricate different types of pretty and decent products.

DETAILED DESCRIPTION OF THE DRAWINGS

20 Figure 1 is a sketch figure showing the structure of the sliver feeding devise.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

25 Figure 1 shows a preferred embodiment of the present invention. A sliver feeding devise has a raw material tank 1, a brambly catching roller 4, a brambly dividing roller 7; a feeding belt conveyer 12 is in the bottom of the raw material tank 1; a inclined feeding belt conveyer 2 with fan shape tooth 10 is located at the end of the feeding
30 conveyer belt 12; a adjustable ever roller 3 is located above the middle of the inclined feeding belt conveyer 2;

the brambly catching roller 4 is located at the top of the inclined feeding conveyer belt 2; a first subsiding room 5 is located under the brambly catching roller 4; an even roller 6 and a brambly dividing roller 7 are located the
5 end of the first subsiding room 5, the even roller 6 and brambly dividing roller 7 have opposite turning directions; a second subsiding room 8 is located under the brambly dividing roller 7, its discharging port appears bar shape cross section; the discharging port is connected with two
10 dust cages 9 coincidentally; the two dust cages 9 have inhaling chambers that make the two dust cages 9 in negative pressure, the two dust cages 9 have same turning directions; the first and second subsiding rooms 5 and 8, the brambly catching roller 4, the brambly dividing roller
15 7, and the chamber 11 for the feeding belt conveyer 12, they are connected and communicated together by the case 13.

EMBODIMENT 1

20 A kind of down branch fiber fabric has a blend ration by weight of 70% down branch fiber and 30% textile fiber.

Process:

25 Raw material screening → sliver feeding → twisting → winding packages → heat setting → weaving → end product storing

Procedure demonstration:

30 A. Raw material screening:

Get down branch fibers by cutting their quills and shafts off from feathers and downs, where the feathers and downs are collected from waterfowls such as geese, ducks and the like. Textile fibers are adopted from at least one of
5 textile yarn or long silk yarn, which are made from nature fibers including cotton, wool, ramie fiber, or synthetic fibers including terylene, nylon, acrylic, polyvinyl chloride, polypropylene, spandex, vinylon, or chemical viscose fibers.

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B. Sliver feeding equipment:

This equipment is designed to accommodate for the nature characteristics of the down branch fibers, such as non-crimp, fluffy, non-hold, etc. The down branch fibers or its
15 mixtures are sent out from the raw material tank by the feeding belt conveyer, controlled by the adjustable ever roller continuously, even and in quantity, then fed to brambly catching roller, then combed twice by the brambly catching roller and brambly dividing roller, then evened
20 again by the even roller, then subsided twice by the first and second subsiding rooms; and then fed out through the discharging port finally. A continuous, even strip in certain quantity falls down into a wedge groove consisted by the two dust cages with negative pressure. Finally,
25 even thin strips are produced.

C. Twisting:

Before twisting, according to different raw materials,
30 yarns or long silk yarns as heart yarns are guided into the inner of the thin strips of down branch fiber, and then

according to friction spinning technology the two dust cages with negative pressure and same turning direction twists them together to form a kind of down branch fiber yarns, the down branch fibers wrap the heart yarns.

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D. Winding packages:

Use current technology to wind the down branch fiber yarns on cones.

10 E. Heat setting

Put down branch fiber yarns on cones into a calorstat-room to heat up, during the heat setting period, heating temperature is generally from 80° to 120°C, and total spending time is from 5 to 20 minutes.

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F. Weaving

Through knitting or weaving, make many kinds of fabrics with heat-retaining feature from down branch fiber yards.

20 G. Put qualified products in storehouses

Inspect products and put qualified products in storehouses

EMBODIMENT 2

25 A kind of down branch fiber fabric has a blend ration by weigh of 100% down branch fiber and 0% textile fiber.

Process:

Raw material screening → sliver feeding → twisting →
30 winding packages → heat setting → self-twist spinning →
weaving → end product storing

Procedure demonstration:

A. Twisting:

- 5 Use the two dust cages with negative pressure and same turning direction to twist the thin strips of down branch fibers to form down branch fiber yarns in line with modern friction spinning technology.

10 B. Self-twist spinning

In line with the current textile technology spin the down branch fiber yarns into strands.

C. Weaving

- 15 Through knitting or weaving, make strands as different kinds of fabrics with heat-retaining feature.

D. Other working procedures are the same as the embodiment 1.

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Embodiment 3

A kind of down branch fiber fabric has a blend ration by weight of 90% down branch fiber and 10% textile fiber.

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Process:

Raw material screening → sliver feeding → twisting → winding packages → heat setting → wrapping → weaving → end product storing

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Procedure demonstration:

A. Raw material screening:

Textile fibers are adopted from nature fibers or synthetic fibers or long silk yarns.

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B. Wrapping:

Use down branch fiber yard as heart yarn, where wrap the heart yarn by nature fibers or synthetic fibers or long silk yarns to form a wrapping heart yarn.

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C. Other working procedures are the same as the embodiment 1.

EMBODIMENT 4

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A kind of down branch fiber fabric has a blend ration by weight of 50% down branch fiber and 50% textile fiber by weight.

20 Process:

Raw material screening → mixing → sliver feeding → twisting → winding packages → heat setting → weaving → end product storing

25 Procedure demonstration:

A. Raw material screening:

Textile fibers are adopted from nature fibers or synthetic fibers.

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B. Mixing:

Mix down branch fibers with nature and/or synthetic fibers.

C. Twisting:

Use two dust cages with negative pressure and same turning direction to twist the thin strip of the mixture of down branch fibers nature and/or synthetic fibers to become a strip or a roving in correspondence with the turning rate of the dust cages. Then use rotor spinning and self-actor mules to spin them to become fine counts.

D. Other working procedures are the same as the embodiment 1.

EMBODIMENT 5

A kind of down branch fiber fabric has a blend ration by weigh of 10% down branch fiber and 90% textile fiber.

Process is the same as the embodiment 4.

Procedure demonstration:

A. Weaving

Using down branch fiber yarn or down branch fiber mixture yarn as woof, other yarns as warp to weave.

B. Other working procedures are the same as the embodiment 4.

EMBODIMENT 6

A kind of down branch fiber fabric has a blend ration by weigh of 20% down branch fiber and 80% textile fiber by weight.

5 Process:

Raw material screening → mixing → sliver feeding → twisting → winding packages → heat setting → self-twist spinning → weaving → end product storing

10 Procedure demonstration:

A. Self-twist spinning

Self-twist spin the down branch fiber yarn or down branch fiber mixture yarn with other fiber yarns to become strand
15 yarn.

B. Other working procedures are the same as the embodiment 4.